

**RECEIVED  
CENTRAL FAX CENTER**

713 431 4664 P.09

Attorney Docket 20041-K997  
1<sup>st</sup> Office Action dated 07-19-2007

OCT 19 2007

**AMENDMENTS TO THE CLAIMS**

A complete listing of the claims as currently amended herein follows. Support for many of the amendments shown below is discussed in the Remarks. Claim 4 is corrected to correct a typographical error as required by the examiner. Claim 5 is amended to update antecedent basis consistent with amendment to claim 1. Claim 8 has two amendments; one is to follow a suggestion made by the examiner to correct an informality, and the other is to update antecedent basis consistent with amendment to claim 1. Claims 14 and 15 are amended to update antecedent basis consistent with amendment to claim 10. Claims 21 and 22 are amended to update antecedent basis consistent with amendment to claim 17.

**CLAIM LISTING**

1. *(Currently amended)* A method for constructing a geologic model predicting properties of a hydrocarbon reservoir ~~recomposite sedimentary body~~ in a subsurface region ~~reservoir~~ and using the model to plan development or predict hydrocarbon volumes or production rates of the reservoir, comprising:

(a) determining at least a partial outline of the composite sedimentary body in the subsurface region from stratigraphic surfaces identified from seismic data, other subsurface imaging techniques, well logs or outcrop observations, said composite sedimentary body comprising a plurality of fundamental bodies created by flowing, sediment-laden water;

(b) characterizing properties of fundamental bodies in the composite sedimentary body;

(c) simulating generation of generating a fundamental body based on the characterized properties of the fundamental bodies, wherein the fundamental body grows until it becomes large enough to divert the sediment-laden flow that creates it;

(d) placing the fundamental body into the ~~partial~~ outline of the composite sedimentary body;

(e) repeating steps (c) through (d) one or more times until the ~~partial~~ outline of the composite sedimentary body contains a plurality ~~is substantially full~~ of fundamental bodies; -

(f) constructing a geologic model of a hydrocarbon reservoir in the subsurface region, said model being based on the fundamental bodies from the preceding step; and

(g) using the geologic model to plan development or predict hydrocarbon volumes or production rates of the reservoir.

2. *(Original)* The method of claim 1, wherein the properties of the fundamental bodies are characterized by a method chosen from the group consisting of: determining local inlet properties of flows which built the fundamental bodies,

determining trends in the local inlet properties of the flows which built the fundamental bodies, determining statistical distributions of the local inlet properties of the flows which built the fundamental bodies, and any combination thereof.

3. *(Original)* The method of claim 2, wherein the local inlet properties are chosen from the group consisting of: flow velocity at an inlet, flow height at the inlet, suspended sediment volume within at least one grain size range at the inlet, inlet width, flow duration, inlet location, order in which the inlet is active relative to local inlets of other fundamental bodies, and any combination thereof.

4. *(Currently amended)* The method of claim 1, wherein the properties of the fundamental bodies comprise at least one member of the group: shapes of the fundamental bodies, sizes of the fundamental bodies, heights of the fundamental bodies, grain size distributions in at least one point within the fundamental bodies, bedding types in at least one point within the fundamental bodies, degrees of erosional scour below the fundamental bodies associated with deposition of the fundamental bodies, shape of a channel feeding sediment to an inlet, size of the [[a]] channel feeding sediment to the inlet, degree of erosional scour caused by a channel feeding sediment to the inlet, at least one property of sediment which forms the channel feeding sediment to the inlet, at least one property of sediment which subsequently fills the channel feeding sediment to the inlet, and any combination thereof.

5. *(Currently amended)* The method of claim 1, wherein the ~~at least the partial~~ outline of the composite sedimentary body is determined from seismic data.

6. *(Original)* The method of claim 1, wherein the properties of at least one of the fundamental bodies are determined using grain size and body thickness measurements from a well sample.

7. *(Original)* The method of claim 1, wherein the properties of at least one of the fundamental bodies are determined by using at least part of an outline form of an identified fundamental body.

8. *(Currently amended)* The method of claim 1, wherein characterizing the properties of the fundamental bodies throughout in the composite sedimentary body

includes at least determining properties of fundamental bodies from the ~~partial~~ outline of the composite sedimentary body.

9. (*Original*) The method of claim 2, wherein a possible range of the inlet flow properties is constrained by mathematical relationships between at least two of the local inlet properties.

10. (*Currently amended*) A method for constructing a geologic model predicting the properties of a hydrocarbon reservoir ~~composite sedimentary body in a subsurface region~~ reservoir and using the model to plan development or predict hydrocarbon volumes or production rates of the reservoir, comprising:

(a) determining at least a partial outline of the composite sedimentary body in the subsurface region;

(b) determining at least a partial outline of at least one identified fundamental body within the composite sedimentary body;

(c) determining properties of at least one identified fundamental body within the composite sedimentary body;

(d) characterizing the properties of fundamental bodies in the composite sedimentary body;

(e) simulating generation of generating another fundamental body to be placed in the ~~partial~~ outline of the composite sedimentary body;

(f) placing the other fundamental body into the ~~partial~~ outline of the composite sedimentary body;

(g) repeating steps (e) through (f) until the ~~partial~~ outline of the composite sedimentary body is substantially full ~~contains~~ a plurality of fundamental bodies;

(h) constructing a geologic model of a hydrocarbon reservoir in the subsurface region, said model being based on the fundamental bodies from the preceding step; and

(i) using the geologic model to plan development or predict hydrocarbon volumes or production rates from the reservoir.

11. *(Original)* The method of claim 10, wherein the properties of the fundamental bodies are characterized by a method selected from the group consisting of: determining local inlet properties of flows which built the fundamental bodies, determining trends in the local inlet properties of flows which built the fundamental bodies, determining statistical distributions of the local inlet properties of flows which built the fundamental bodies, and any combination thereof.

12. *(Original)* The method of claim 11, wherein the local inlet properties are chosen from the group consisting of: flow velocity at an inlet, flow height at the inlet, suspended sediment volume within at least one grain size range at the inlet, inlet width, flow duration, inlet location, order in which the inlet is active relative to local inlets of other fundamental bodies, and any combination thereof.

13. *(Currently amended)* The method of claim 10, wherein the properties of the fundamental bodies comprise at least one member of the group: shapes of the fundamental bodies, sizes of the fundamental bodies, heights of the fundamental bodies, grain size distributions in at least one point within the fundamental bodies, bedding types in at least one point within the fundamental bodies, degrees of erosional scour below the fundamental bodies associated with deposition of the fundamental bodies, shape of ~~at~~the channel feeding sediment to an inlet, size of the channel feeding sediment to the inlet, degree of erosional scour caused by the channel feeding sediment to the inlet, at least one property of sediment which forms the channel feeding sediment to the inlet, at least one property of sediment which subsequently fills the channel feeding sediment to the inlet, and any combination thereof.

14. *(Currently amended)* The method of claim 10, wherein the ~~at least the partial~~ outline of the composite sedimentary body is determined from seismic data.

15. *(Currently amended)* The method of claim 10, wherein the ~~at least the partial~~ outline of at least one identified fundamental body is determined from seismic data.

16. *(Original)* The method of claim 11, wherein a possible range of the local inlet properties is constrained by mathematical relationships between at least two of the local inlet properties.

17. *(Currently amended)* A method for constructing a geologic model predicting properties of a subsurface hydrocarbon reservoir in a subsurface region and using the model to plan development or predict hydrocarbon volumes or production rates of the reservoir which is a composite sedimentary body in a subsurface reservoir, comprising:

(a) determining at least a partial outline of the composite sedimentary body in the subsurface region;

(b) measuring thickness and grain size distribution at one point in at least one identified fundamental body within the partial outline of the composite sedimentary body;

(c) determining properties of the at least one identified fundamental body within the composite sedimentary body from a point measurement of thickness and grain size distribution within the at least one identified fundamental body;

(d) characterizing properties of fundamental bodies in throughout the composite sedimentary body;

(e) simulating generation of generating [[a]] another fundamental body to be placed in the partial outline of the composite sedimentary body;

(f) placing the other fundamental body into the partial outline of the composite sedimentary body;

(g) repeating steps (e) through (f) until the partial outline of the composite sedimentary body contains a plurality is substantially full of fundamental bodies;

(h) constructing a geologic model of a hydrocarbon reservoir in the subsurface region, said model being based on the plurality of fundamental bodies from the preceding step; and

(i) using the geologic model to plan development or predict hydrocarbon volumes or production rates of the reservoir.

18. *(Original)* The method of claim 17, wherein the properties of the fundamental bodies are characterized by a method selected from the group consisting of: determining local inlet properties of flows which built the fundamental bodies, determining trends in the local inlet properties of the flows which built the fundamental bodies, determining statistical distributions of the local inlet properties of the flows which built the fundamental bodies, and any combination thereof.

19. *(Original)* The method of claim 18, wherein the local inlet properties are chosen from the group consisting of: flow velocity at an inlet, flow height at the inlet, suspended sediment volume within at least one grain size range, inlet width, flow duration, inlet location, order in which the inlet is active relative to local inlets of other fundamental bodies, and any combination thereof.

20. *(Original)* The method of claim 17, wherein the properties of the fundamental bodies—comprise at least one member of the group: shapes of the fundamental bodies, sizes of the fundamental bodies, heights of the fundamental bodies, grain size distributions in at least one point within the fundamental bodies, bedding types in at least one point within the fundamental bodies, degrees of erosional scour below the fundamental bodies associated with deposition of the fundamental bodies, shape of a channel feeding sediment to a inlet, size of the channel feeding sediment to the inlet, degree of erosional scour caused by the channel feeding sediment to the inlet, at least one property of sediment which forms the channel feeding sediment to the inlet, at least one property of sediment which subsequently fills the channel feeding sediment to the inlet, and any combination thereof.

21. *(Currently amended)* The method of claim 17, wherein the ~~at least the partial~~ outline of the composite sedimentary body is determined from seismic data.

22. *(Currently amended)* The method of claim 17, wherein the properties of the fundamental bodies are determined by using at least the ~~partial~~ outline of the composite sedimentary body.

23. *(Original)* The method of claim 18, wherein a possible range of the local inlet properties is constrained by mathematical relationships between at least two of the local inlet properties.
24. *(New)* The method of claim 1, wherein steps (c)-(d) are repeated until another fundamental body will not fit inside the outline.
25. *(New)* The method of claim 1, wherein steps (c)-(d) are repeated until the outline of the composite sedimentary body is substantially full of fundamental bodies.
26. *(New)* The method of claim 1, wherein the fundamental bodies are simulated in three dimensions and the geologic model is a three-dimensional model.